

NOTIFICATION PURSUANT TO
SECTION 6 OF DSHEA

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In compliance with Section 6 of the Dietary Supplement Health Education Act (DSHEA) and Rule 21 C.F.R. 101,93, this Notification is filed on behalf of the following manufacturer of **Metaform™ NeuroDrive 1500 Product #50474** bearing the statements set out below:

Weider Nutrition International., Inc.
2002 South 5070 West
Salt Lake City, Utah 84104

The text of the structure-function claim is “Pre-exercise mental booster” and the nutrients (**Synephrine, Caffeine, Yohimbine, Tyrosine, DMAE, Choline, B Vitamins and Ginkgo biloba**) areas follows:

- (Statement 1)** L-Tyrosine has been shown to prevent decreased physical performance during periods of mental fatigue. L-Tyrosine is the precursor for neurotransmitters critical for mental focus and alertness.
- (Statement 2)** DMAE is a constituent of sardines and other “brain foods” which has a **cholinergic** effect (mimics choline).
- (Statement 3)** Choline supplementation at 1000 mg per day to athletes improved run times, decreased feelings of fatigue and increased vigor. Choline is the precursor for **acetylcholine** which stimulates muscular contraction from nervous impulses.
- (Statement 4)** Caffeine has well-documented effects on improving concentration, short-term memory retention, alertness and feelings of **well-being**.
- (Statement 5)** Synephrine is the active component of the Chinese herb **Zhi Shi** (bitter Citrus fruit), and is produced normally by the brain. Synephrine has synergistic effects with caffeine and yohimbine.
- (Statement 6)** Yohimbine is the active component of Yohimbe bark, and has synergistic effects with synephrine and caffeine.

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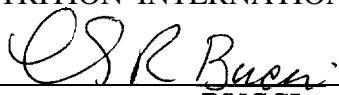
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I, Luke R. Bucci, Ph. D., CCN, CNS, Vice President of Research at Weider Nutrition International., Inc. am authorized to **certify** this Notification of behalf of the Company. I certify that the information presented and contained in **this** Notification is complete and accurate and that the **Office of Regulatory Affairs** at Weider Nutrition International, Inc. has substantiation that each statement is **truthful** and not misleading.

DATED this 25th day of March, 19998.

WEIDER NUTRITION INTERNATIONAL, INC

BY:



DR. LUKE R. BUCCI

Vice President of Research

STRUCTURE / FUNCTION CLAIMS

NUTRIENTS: Synephrine / Caffeine / Yohimbine / Tyrosine / DMAE / Choline / B Vitamins/ Ginkgo biloba

DATE: February 18, 1998

BY: Luke R. Bucci, PhD

Document Name: sfOI neur.wpd

BRAND, CODE # & PRODUCT NAME(S): Metaform 50474 NeuroDrive 1500

NUTRIENT AMOUNT: 1500 mg L-tyrosine; 1000 mg choline (as bitartrate); 500 mg DMAE bitartrate; 200 mg caffeine; 10 mg synephrine from Zhi Shi; 12 mg yohimbine from Yohimbe; 100 mg quercetin, high-dose B vitamins

STRUCTURE/FUNCTION CLAIM:

- Pre-exercise mental booster

Neurodrive 1500™ is the ultimate pre exercise energy and mental focusing drink. NeuroDrive 1500's all new formulation represents the latest advancements in nutritional sports science for enhancing the mind-muscle connection. This novel approach adds a new tool to the hard training athlete's array of supplements for enhancing performance. This state of the art formula is designed to step up workout intensity, increase exercise workload and mitigate feelings of burnout from overtraining. Metaform's proprietary nutrient matrix contains a synergistic blend of excitatory neurotransmitter precursors which support the formation of dopamine, norepinephrine, epinephrine and acetylcholine. NeuroDrive 1500TM does not contain St. John's Wort because clinical studies indicate a possible elevation of brain serotonin and GABA, which may decrease performance in exercising humans.

- L-Tyrosine has been shown to prevent decreased physical performance during periods of mental fatigue. L-Tyrosine is the precursor for neurotransmitters critical for mental focus and alertness.
 - DMAE is a constituent of sardines and other "brain foods" which has a cholinergic effect [mimics choline].
 - Choline supplementation at 1000 mg per day to athletes improved run times, decreased feelings of fatigue and increased vigor. Choline is the precursor for acetylcholine which stimulates muscular contraction from nervous impulses.
 - Caffeine has well-documented effects on improving concentration, short-term memory retention, alertness and feelings of well-being.
 - Synephrine is the active component of the Chinese herb Zhi Shi (bitter Citrus fruit), and is produced normally by the brain. Synephrine has synergistic effects with caffeine and yohimbine.
 - Yohimbine is the active component of Yohimbe bark, and has synergistic effects with synephrine and caffeine.
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Approved by/ Date

REFERENCES:

L-TYROSINE

1. Agharanya JC, Alonso R, Wurtman RJ. Changes in catecholamine excretion after short-term tyrosine ingestion in normally fed human subjects. *Am J Clin Nutr* 1981; 34:82-87.
2. Gibson CJ, Wurtman RJ. Physiological control of brain catechol synthesis by brain tyrosine concentration. *Biochem Biopharmacol* 1977; 26:1137-1142.
3. Salter CA. Dietary tyrosine as an aid to stress resistance among troops. *Mil Med* 1989; 154:144-146.
4. Lieberman HR, Spring BJ, Garfield GS. The behavioral effects of food constituents: strategies used in studies of amino acids, protein, carbohydrates and caffeine. *Nutr Rev Suppl* 1986; 44:61-75.
5. Lieberman HR, Corkin S, Spring BJ, et al. The effects of tryptophan and tyrosine on human mood and performance. *Psychopharmac Bull* 1984; 20:595-598.
6. Melamed E, Glaeser B, Growdon JH, Wurtman RJ. Plasma tyrosine in normal humans: effects of oral tyrosine and protein-containing meals. *J Neural Trans* 1980; 47(4):299-306.
7. Reinstein DK, Lehnert H, Scott NA, Wurtman RJ. Tyrosine prevents behavioral and neurochemical correlates of an acute stress in rats. *Life Sci* 1984; 34(23):2225-2231.
8. Reinstein DK, Lehnert H, Wurtman RJ. Dietary tyrosine suppresses the rise in plasma corticosterone following acute stress in rats. *Life Sci* 1985; 37(23):2157-2163.
9. Lehnert H, Reinstein DK, Stowbridge BW, Wurtman RJ. Neurochemical and behavioral consequences of acute, uncontrollable stress: effects of dietary tyrosine. *Brain Res* 1984; 303(2):215-223.
10. Shurtleff D, Thomas JR, Schrot J, Kowalski K, Harford R. Tyrosine reverses a cold-induced working memory deficit in humans. *Pharmacol Biochem Behav* 1994; 47(4):935-941.
11. Dollins AB, Krock LP, Storm WF, Wurtman RJ, Lieberman HR. L-Tyrosine ameliorates some effects of lower body negative pressure stress. *Physiol Behav* 1995; 57(2):223-230.
12. Deijen JB, Orlebeke JF. Effect of tyrosine on cognitive function and blood pressure under stress. *Brain Res Bull* 1994; 33(3):319-323.
13. Neri DF, Wiegmann D, Stanny RR, Shappell SA, McCardie A, McKay DL. The effects of tyrosine on cognitive performance during extended wakefulness. *Aviat Space Environ Med* 1995; 66(4):313-319.
14. Banderet LE, Lieberman HR. Treatment with tyrosine, a neurotransmitter precursor, reduces environmental stress in humans. *Brain Res Bull* 1989; 22(4):759-762.
15. Lieberman HR, Corkin S, Spring BJ, Growdon JH, Wurtman RJ. Mood, performance, and pain sensitivity: changes induced by food constituents. *J Psychiatr Res* 1982; 17(2):135-145.
16. Lieberman HR, Corkin S, Spring BJ, Wurtman RJ, Growdon JH. The effects of dietary neurotransmitter precursors on human behavior. *Am J Clin Nutr* 1985; 42(2):366-370.
17. Owasoyo JO, Neri DF, Lamberth JG. Tyrosine and its potential use as a countermeasure to performance decrement in military sustained operations. *Aviat Space Environ Med* 1992; 63(5):364-369.

DMAE (DIMETHYLAMINOETHANOL)

1. Latz A, Kornetsky C, Bain G, Goldman M. Swimming performance of mice as affected by antidepressant drugs and baseline levels. *Psychopharmacologia* 1966; 10(1):67-88.
2. Conners CK, Deanol and behavior disorders in children: a critical review of the literature

- and recommended future studies for determining efficacy. *Psycho/ Pharm Bull* 1973; 188-195.
3. Rugginenti A. Effects of dimethylaminoethanol acetyl glutamate on the attentive capacity of a group of soccer players. *Arch Maragliano Pate/Clin* 1974; 30(2):189-198.
 4. Re O. 2-Dimethylaminoethanol (deanol): a brief review of its clinical efficacy and postulated mechanism of action. *Curr Ther Res C/in Exp* 1974; 16(11):1238-1242.
 5. Casey DE. Mood alterations during Deanol therapy. *Psychopharmacology* 1979; 62:187-191.
 6. Marsh GR, Linnoila M. The effects of deanol on cognitive performance and electrophysiology in elderly humans. *Psychopharmacology* 1979; 66(1):99-104.
 7. Haubrich DR, Gerber NH, Pflueger AB. Deanol affects choline metabolism in peripheral tissues of mice *J Neurochem* 1981; 37(2):476-482.
 8. Sergio W. Use of DMAE (2-dimethylaminoethanol) in the induction of lucid dreams. *Med Hypotheses* 1988; 26(4):255-257.
 9. Dimpfel W, Hofmann HC, Prohaska A, Schober F, Schellenberg R. Source density analysis of functional topographical EEG: monitoring of cognitive drug action. *Eur J Med Res* 1996; 1(6):283-290.
 10. Dormard Y, Levron JC, Le Fur JM. Pharmacokinetic study of maleate acid of 2-(N,N-dimethylaminoethanol-14C)-cyclohexylpropionate (cyprodenate) and of 'N, N-dimethylaminoethanol-14C1 in animals. *Arzneimforsch* 1975; 25(2):201-207.

CHOLINE

1. Cohen EL, Wurtman RJ. Brain acetylcholine: control by dietary choline. *Science* 1976; 191:561-562.
2. Hirsch MJ, Growdon JH, Wurtman RJ. Relations between dietary choline or lecithin intake, serum choline levels, and various metabolic indices. *Metabolism* 1978; 27(8):953.
3. Bartus RT, Dean RL, Goas JA, Lippa AS. Age-related changes in passive avoidance retention: modulation with dietary choline. *Science* 1980; 209:301-303.
4. Conlay LA, Wurtman RJ, Blusztajn K, Coviella IL, Maher TJ, Evoniuk GE. Decreased plasma choline concentrations in marathon runners. *N Eng/ J Med* 1986; 315(14):892.
5. Zeisel SH, Da Costa KA, Franklin PD, Alexander EA, Lament JT, Sheard NF, Beiser A. Choline, an essential nutrient for humans. *FASEB J* 1991; 5:2093-2098.
6. Sandage BW, Sabounjian L, White R, Wurtman RJ. Choline citrate may enhance athletic performance. *Physiologist* 1992; 35:236a.
7. Conlay LA, Sabounjian LA, Wurtman RJ. Exercise and neuromodulators: choline and acetylcholine in marathon runners. *Int J Sports Med* 1992; 13(Suppl 1):S141-S142.
8. Landers DM, He CX, Etnier JL, Willis WT, Spector SA, Jackman MR. The effects of choline on cognitive function and mood state following exhaustive exercise. *Med Sci Sports Exer* 1994; 26(5):S157.
9. Kanter MM, Williams MH. Antioxidants, carnitine, and **choline as putative** ergogenic aids. *Int J Spools Nutr* 1995; 5: S120-S131.
10. Spector SA, Jackman MR, Sabounjian LA, Sakkas C, **Landers DM, Willis WT. Effect of** choline supplementation on fatigue in trained cyclists. *Med Sci Sports Exer* 1995; 27(5):668-673.
11. Sandage RW, Sabounjian LA, Wurtman RJ. Effects of choline on athletic performance and fatigue, presented at *The Role of Dietary Supplements for Physics//y Active Peep/e, NIH*. Workshop, Bethesda, MD, June 3-4, 1996.

SYNEPHRINE (ZHI SHI, BITTER CITRUS, CITRUS AURANTIUM)

1. Boulton AA, Wu PH. Biosynthesis of cerebral phenolic amines. 1. In vivo formation of p-tyramine, octopamine, and synephrine. *Can J Biochem* 1972; 50(3):261-267.
2. Ibrahim KE, Couch MW, Williams CM, Fregly MJ, Midgley JM. M-Octopamine: normal occurrence with p-octopamine in mammalian sympathetic nerves. *J Neurochem* 1985; 44(6): 1862-1867.
3. Suzuki O, Matsumoto T, Oya M, Katsumata Y. Oxidation of synephrine by type A and type B monoamine oxidase. *Experientia* 1979; 35(10): 1283-1284.
4. Airriess CN, Rudling JE, Midgley JM, Evans PD. Selective inhibition of adenylyl cyclase by octopamine via a human cloned alpha 2A-adrenoreceptor. *Br J Pharmacol* 1997; 122(2):191 -198.
5. Arai K, Jin D, Kusu F, Takamura K. Determination of p-hydroxyphenandelic acid enantiomers in urine by high-performance liquid chromatography with electrochemical detection. *J Pharm Biomed Aria/* 1997; 15:1509-1514.
6. Song DK, Suh HW, Jung JS, Wie MB, Son KH, Kim YH. Antidepressant-like effects of p-synephrine in mouse models of immobility tests. *Neurosci Lett* 1996; 214:107-110.
7. Kusu F, Matsumoto K, Arai K, Takamura K. Determination of synephrine enantiomers in food and conjugated synephrine in urine by high-performance liquid chromatography with electrochemical detection. *Aria/Biochem* 1996; 235(2):191-194.
8. Zhao XW, Li Jx, Zhu ZR, Sun DQ, Liu SC. Anti-shock effects of synthetic effective compositions of fructus aurantii immaturus. Experimental study and clinical observation. *Chin Med J* 1989; 102:91-93.
9. Brown CM, McGrath JC, Midgley JM, Muir AG, O'Brien JW, Thonoor CM, Williams CM, Wilson VG. Activities of octopamine and synephrine stereoisomers on alpha-adrenoreceptors. *Br J Pharmacol* 1988; 93(2):417-429.
10. Jordan R, Midgley JM, Thonoor CM, Williams CM. Beta-adrenergic activities of octopamine and synephrine stereoisomers on guinea-pig atria and trachea. *J Pharm Pharmacol* 1987; 39(9):752-754.
11. Ibrahim KE, Midgley JM, Crowley JR, Williams CM. The mammalian metabolism of R-(-)-m-synephrine. *J Pharm Pharmacol* 1983; 35(3):144-147.
12. Hengstmann JH, Aulepp H. Pharmacokinetics and metabolism of 3H-synephrine. *Arzneimittelforschung* 1978; 28(12):2326-2331.
13. Midgely JM, Couch MW, Crowley JR, Williams CM. M-Synephrine: normal occurrence in adrenal gland. *J Neurochem* 1980; 34(5):1225-1230.

CAFFEINE

1. Clarkson PM. Nutritional ergogenic aids: caffeine. *Int J Sports Nutr* 1993; 3:103-111,
2. Dodd SL, Herb RA, Powers SK. Caffeine and exercise performance. An update. *Sports Med* 1993; 15(1):14-23.
3. Nehlig A, Debry G. Caffeine and sports activity: a review. *Int J Spools Med* 1994; 15(5):215-223.
4. Thoburn R. Caffeine as an ergogenic aid. *Drugs Sports* 1994; 2(4): 18-20.
5. Tarnopolsky MA. Caffeine and endurance performance. *Sports Med* 1994; 18:109-125.
6. Spriet LL. Caffeine and performance. *Int J Sports Nutr* 1995; 5: S84-S99.
7. Graham TE, Spriet LL. Caffeine and exercise performance. *Sports Sci Exchange* 1996; 9(1):1-5.
8. Spiller G, Ed. *Caffeine* CRC Press, Boca Raton, FL, 1997.

9. Johnson DA, Ulus IH, Wurtman RJ. Caffeine potentiates the enhancement by choline of striatal acetylcholine release. *Life Sci* 1992; 51(20):1597-1601.
10. Roussinov KS, Yonkov DI. Cholinergic mechanisms in the learning and memory facilitating effect of caffeine. *Acta Physiol Pharmacol Bulg* 1976; 2(3):61-68.
11. Rapoport JL, Jensvold M, Elkins R, Buchsbaum MS, Weingartner H, Ludlow C, Zahn TP, Berg CJ, Neims AH. Behavioral and cognitive effects of caffeine in boys and adult males. *J Nerv Merit Dis* 1981; 169(11):726-732.
12. Sawyer DA, Julia HL, Turin AC. Caffeine and human behavior: arousal anxiety, and performance effects. *J Behav Med* 1982; 5(4):415-439.
13. Bruce M, Scott N, Lader M, Marks V. The psychopharmacological and electrophysiological effects of single doses of caffeine in healthy human subjects. *Br J C/in Pharmacol* 1986; 22(1):81-87.
14. Lieberman HR, Wurtman RJ, Erode GG, Roberts C, Coviella IL. The effects of low doses of caffeine on human performance and mood. *Psychopharmacology* 1987; 92(3):308-312.
15. Loke WH. Effects of caffeine on mood and memory. *Physiol Behav* 1988; 44(3):367-372.
16. Stern KN, Chait LD, Johanson CE. Reinforcing and subjective effects of caffeine in normal human volunteers. *Psychopharmacology* 1989; 98(1):81-88.
17. Smith AP, Rusted JM, Eaton-Williams P, Savory M, Leathwood P. Effects of caffeine given before and after lunch on sustained attention. *Neuropsychobiology* 1990; 23(3):160-163.
18. Zwyghuizen-Doorenbos A, Roehrs TA, Lipschutz L, Timms V, Roth T. Effects of caffeine on alertness. *Psychopharmacology* 1990; 100(1):36-39.
19. Nehlig A, Daval JL, Debry G. Caffeine and the central nervous system: mechanisms of action, biochemical, metabolic and psychostimulant effects. *Brain Res Brain Res Rev* 1992; 17(2):139-170.
20. Smith AP, Kendrick AM, Maben AL. Effects of breakfast and caffeine on performance and mood in the late morning and after lunch. *Neuropsychobiology* 1992; 26(4):198-204.
21. Mitchell PJ, Redman JR. Effects of caffeine, time of day and user history on study-related performance. *Psychopharmacology* 1992; 109:121-126.
22. Gupta U. Effects of caffeine on recognition. *Pharmacol Biochem Behav* 1993; 44(2):393-396.
23. Jarvis MJ. Does caffeine intake enhance absolute levels of cognitive performance? *Psychopharmacology* 1993; 110:45-52.
24. Smith A, Kendrick A, Maben A, Salmon J. Effects of breakfast and caffeine on cognitive performance, mood and cardiovascular functioning. *Appetite* 1994; 22(1):39-55.
25. Smith A, Maben A, Brockman P. Effects of evening meals and caffeine on cognitive performance, mood and cardiovascular functioning. *Appetite* 1994; 22(1):57-65.
26. Lorist MM, Snel J, Kok A. Influence of caffeine on information processing stages in well rested and fatigued subjects. *Psychopharmacology* 1994; 113:411-421.
27. Fine BJ, Kobrick JL, Lieberman HR, Marlowe B, Riley RH, Tharion WJ. Effects of caffeine or diphenhydramine on visual vigilance. *Psychopharmacology* 1994; 114(1):233-238.
28. Hasenfratz M, Battig K. Acute dose-effect relationships of caffeine and mental performance, EEG, cardiovascular and subjective parameters. *Psychopharmacology* 1994; 114(2):281-287.
29. Mumford GK, Evans SM, Kaminski BJ, Preston KL, Sannerud CA, Silverman K, Griffiths RR. Discriminative stimulus and subjective effects of theobromine and caffeine in humans. *Psychopharmacology* 1994; 115:1-8.
30. Linde L. Mental effects of caffeine in fatigued and non-fatigued female and male subjects.

- Ergonomics* 1995; 38(5):864-885.
31. Rogers PJ, Richardson NJ, Dernoncourt C. Caffeine use: is there a net benefit for mood and psychomotor performance? *Neuropsychobiology* 1995; 31(4): 195-199.
 32. Miller LS, Lombardo TW, Fowler SC. Caffeine and time of day effects on a force discrimination task in humans. *Physiol Behav* 1995; 57(6):11 17-1125.
 33. Warburton DM. Effects of caffeine on cognition and mood without caffeine abstinence. *Psychopharmacology* 1995; 119(1):66-70.

YOHIMBINE

1. Damase-Michel C, Tran MA, Llau ME, Chollet F, Senard JM, Guiraud-Chaumeil B, Montastruc JL, Montastruc P. The effect of yohimbine on sympathetic responsiveness in essential hypertension. *Eur J Clin Pharmacol* 1993; 44(2): 129-201.
2. Galitzky J, Vermorel M, Lafontan M, Montastruc P, Berlan M. Thermogenic and lipolytic effect of yohimbine in the dog. *Br J Pharmacol* 1991; 104(2):514-518.
3. Berlan M, Galitzky J, Tran MA, Montastruc P. Anorectic effect of alpha 2-antagonists in dog: effect of acute and chronic treatment. *Pharmacol Biochem Behav* 1991; 39(2):31 3-320.
4. Valet P, Taouis M, Tran MA, Montastruc P, Lafontan M, Brian M. Lipomobilizing effects of procaterol and yohimbine in the conscious dog: comparison of endocrinological, metabolic and cardiovascular effects. *Br J Pharmacol* 1989; 97(1):229-239.
5. Taouis M, Berlan M, Montastruc P, Lafontan M. Mechanism of the lipid-mobilizing effect of alpha-2 adrenergic antagonists in the dog. *J Pharmacol Exp Ther* 1988; 247(3):1172-1180.
6. Sturgill MG, Grasing KW, Rosen RC, Thomas TJ, Kulkarni GD, Trout JR, Maines M, Seibold JR. Yohimbine elimination in normal volunteers is characterized by both one- and two-compartment behavior. *J Cardiovasc Pharmacol* 1997; 29(6):697-703.
7. Grasing K, Sturgill MG, Rosen RC, Trout JR, Thomas TJ, Kulkarni GD, Maines P, Seibold JR. Effects of yohimbine on autonomic measures are determined by individual values for area under the concentration-time curve. *J Clin Pharmacol* 1996; 36(9):814-822.
8. Krystal JH, Webb E, Cooney NL, Kranzler HR, Southwick SW, Heninger GR, Charney DS. Serotonergic and noradrenergic dysregulation in alcoholism: m-chlorophenylpiperazine and yohimbine effects in recently detoxified alcoholics and healthy comparison subjects. *Am J Psychiatr* 1996; 153(1):83-92.
9. Krystal JH, McDougle CJ, Woods SW, Price LH, Heninger GR, Charney DS. Dose-response relationship for oral idazoxan effects in healthy human subjects: comparison with oral yohimbine. *Psychopharmacology* 1992; 108(3):31 3-319.
10. Grunhaus L, Tiongco D, Zelnik T, Flegel P, Hollingsworth PJ, Smith CB. Intravenous yohimbine. Selective enhancer of norepinephrine and cortisol secretion and systolic blood pressure in humans. *Clin Neuropharmacol* 1989; 12(2) :106-1 14.
11. Heninger GR, Charney DS, Price LH. Alpha 2-Adrenergic receptor sensitivity in depression. The plasma MHPG, behavioral, and cardiovascular responses to yohimbine. *Arch Gen Psychiatr* 1988; 45(8):718-726.
12. Mattila MI, Seppala T, Mattila MJ. Anxiogenic effect of yohimbine in healthy subjects: comparison with caffeine and antagonism by clonidine and diazepam. *Int Clin Psychopharmacol* 1988; 3(3):215-229.
13. Goldberg MR, Jackson RV, Krakau J, Island DP, Robertson D. **Influence of yohimbine on release of anterior pituitary hormones.** *Life Sci* 1986; 39(5):395-398.

14. Goldberg MR, Hollister AS, Robertson D. Influence of yohimbine on blood pressure, autonomic reflexes, and plasma catecholamines in humans. *Hypertension* 1983; 5(5):772-778.
15. Clark AL, Galloway S, MacFarlane N, Henderson E, Aitchison T, McMurray JJ. Catecholamines contribute to exertional dyspnoea and to the ventilator response to exercise in normal humans. *Eur Heart J* 1997; 18(11):1829-1833.
16. Kenney WL, Zappe DH, Tankersley CG, Derr JA. Effect of systemic yohimbine on the control of skin blood flow during local heating and dynamic exercise. *Am J Physiol* 1994; 266(2 Pt 2):H371-H376.
17. Coull JT. Pharmacological manipulations of the alpha 2-noradrenergic system. Effects on cognition. *Drugs Aging* 1994; 5(2): 116-126.
18. Arnsten AF, Cai JX. Postsynaptic alpha-2 receptor stimulation improves memory in aged monkeys: indirect effects of yohimbine versus direct effects of clonidine. *Neurobiol Aging* 1993; 14(6):597-603.
19. Krystal JH, Webb E, Grillon C, Cooney N, Casal L, Morgan CA, Southwick SM, Davis M, Charney DS. Evidence of acoustic startle hyperreflexia in recently detoxified early onset male alcoholics: modulation by yohimbine and m-chlorophenylpiperazine (mCPP). *Psychopharmacology* 1997; 131(3):207-215.
20. Halliday R, Callaway E, Lannon R. The effects of clonidine and yohimbine on human information processing. *Psychopharmacology* 1989; 99(4):563-566.
21. Musso NR, Vergassola C, Pende A, Lotti G. Yohimbine effects on blood pressure and plasma catecholamines in human hypertension. *Am J Hypertens* 1995; 8(6):565-571.
22. Costa R, Marino A. On the eventual psychotropic, cardiovascular and aphrodisiac properties of yohimbine, an old drug with new indications. *Clin Ter* 1989; 129(3):159-168.

GINKGO BILOBA

1. Pietta PG, Gardana C, Mauri PL. Identification of ginkgo biloba flavanol metabolizes after oral administration to humans. *J Chromatogr B Biomed App* 1997; 693(1):249-255.
2. Klein J, Chatterjee SS, Loffelholz K. Phospholipid breakdown and choline release **under hypoxic conditions: inhibition by bilobalide, a constituent of Ginkgo biloba**. *Brain Res* 1997; 755(2):347-350.
3. Jung F, Mrowietz C, Kieswetter H, Wenzel E. Effect of Ginkgo biloba on fluidity of blood and peripheral microcirculation in volunteers. *Arzneimittelforschung* 1990; 40(5):589-593.
4. Koltringer P, Langsteger W, Klima G, Reisecker F, Eber O. Hemorheologic effects of ginkgo biloba extract Egb 761. Dose-dependent effect of Egb 761 on microcirculation and viscoelasticity of blood. *Fortschr Med* 1993; 111(10):170-172.
5. Auguet M, Delaflotte S, Hellegouarch A, Clostre F. Pharmacological bases of the vascular impact of Ginkgo biloba extract. *Presse Med* 1986; 15(31):1524-1528.
6. Hindmarch I. Activity of Ginkgo biloba extract on short-term memory. *Presse Med* 1986; 15(31): 1592-1594.
7. White HL, States PW, Cooper BR. Extracts of Ginkgo biloba leaves inhibit monoamine oxidase. *Life Sci* 1996; 58(16):1315-1321.
8. Kunkel H. EEG profile of three different extractions of Ginkgo biloba. *Neuropsychobiology* 1993; 27(1):40-45.
9. Smith PF, MacLennan K, Darlington CL. The neuroprotective properties of the Ginkgo biloba leaf a review of the possible relationship to platelet-activating factor (PAF). *J Ethnopharmacol* 1996; 50(3):131-139.

10. Pidoux B. Effects of Ginkgo biloba extract on functional brain activity. An assessment of clinical and experimental studies. *Presse Med* 1986; 15(31):1588-1591.
11. Kleijnen J, Knipschild P. Ginkgo biloba for cerebral insufficiency. *Br J Clin Pharmacol* 1992; 34(4):352-358.
12. Gessner B, Voelp A, Klasser M. Study of the long-term action of a Ginkgo biloba extract on vigilance and mental performance as determined by means of quantitative pharmacoelectroencephalography and psychometric measurements. *Arzneimittelforschung* 1985; 35(9): 1459-1465.
13. Schaffler K, Reeh PW. Double blind study of the hypoxia protective effect of a standardized Ginkgo biloba preparation after repeated administration in healthy subjects. *Arzneimittelforschung* 1985; 35(8): 1283-1286.
14. Pincemail J, Deby C. Antiradical properties of Ginkgo biloba extract. *Presse Med* 1986; 15(31): 1475-1479.
15. Bauer R, Zschoke S. Medical use of Ginkgo biloba L. *Z Phytotherapie* 1996; 17:275-283.
16. Subhan Z, Hindmarch I. The psychopharmacological effect of Ginkgo biloba extract in normal healthy volunteers. *Int J Clin Pharmacol Res* 1984; 4:89-93.
17. Warot D, Lacomblez D, Danjou P, Weiner E, Panjan C, Puech AJ. Comparison des effets d'extraits de Ginkgo biloba sur les performances psychomotrices et la memoire chez le sujet sain. *Therapie* 1991; 26:33-36.
18. DeFeudis FV. *Ginkgo biloba Extract (EGb 761): Pharmacological Activities and Clinical Applications*, Elsevier, Amsterdam, 1991.
19. Itil T, Martorano D. Natural substances in psychiatry (Ginkgo biloba in dementia). *Psychopharmacol Bull* 1995; 31:147-158.
20. Amri H, Drieu K, Papadopoulos V. Ex vivo regulation of adrenal cortical cell steroid and protein synthesis, in response to adrenocorticotrophic hormone stimulation, by the Ginkgo biloba extract EGb 761 and isolated ginkgolide B. *Endocrinology* 1997; 138(12):5415-5426.
21. Amri H, Ogwuegbu SO, Boujrad N, Drieu K, Papadopoulos V. In vivo regulation of peripheral-type benzodiazepine receptor and glucocorticoid synthesis by Ginkgo biloba extract EGb 761 and isolated ginkgolides. *Endocrinology* 1996; 137(12):5707-5718.

B VITAMINS

1. Benton D, Hailer J, Fordy J. Vitamin supplementation for one year improves mood, *Neuropsychobiology* 1995; 32(2):98-105.
2. Benton D, Fordy J, Hailer J. The impact of long-term vitamin supplementation on cognitive functioning. *Psychopharmacology* 1995; 117:298-305.
3. Benton D, Buts JP. Vitamin/mineral supplementation and intelligence. *Lancet* 1990; 335:1158-1160.
4. Heseker H, Kübler W, Pudel V, Westenhofer J. Interaction of vitamins with mental performance. *Bibl Nutr Dicta* 1995; 52:43-55.
5. Kleijnen J, Knipschild P. Niacin and vitamin B6 in mental functioning: A review of controlled trials in humans. *Biol Psychiatry* 1991; 29:931-941.
6. Johnson RE, Darling RC, Forbes WH, Brouha L, Egaña E, Graybiel A. The effects of a diet deficient in part of the vitamin B complex upon men doing manual labor. *J Nutr* 1942; 24:585-596.
7. Early RG, Carlson BR. **Water-soluble vitamin therapy** in the delay of fatigue from physical activity in hot climactic conditions. *Int Z Angew Physiol* 1969; 27:43-50.
8. Van der Beek EJ, van Dokkum W, Schrijver J, Wedel M, Gaillard AWK, Wesstra A, van

- de Weerd H, Hermus RJJ. Thiamin, riboflavin, and vitamins B-6 and C: impact of combined restricted intake on functional performance in man. *Am J Clin Nutr* 1988; 48:1451-1462.
9. Bonke D, Nickel B. Improvement of fine motoric movement control by elevated dosages of vitamin B1, B6, and B12 in target shooting. *Int J Vit Nutr Res* 1989; Suppl 30:198-204.

COMBINATIONS:

1. Shugarman A. Effect of thermogenic dietary supplements on resting metabolic rate in healthy male and female volunteers. Unpublished Master's thesis, University of Utah, 1998.
2. Dishman RK. Introduction: exercise, brain and behavior. *Med Sci Sports Exer* 1996; 29(1):37-44.
3. Dishman RK. Brain monoamines, exercise, and behavioral stress: animal models. *Med Sci Sports Exer* 1996; 29(1):63-74.
4. Wurtman RJ. When -- and why -- should nutritional state control neurotransmitter synthesis? *J Neural Transm Suppl* 1979; 15:69-79.
5. Wurtman RJ, Hefti F, Melamed E. Precursor control of neurotransmitter synthesis. *Pharmacol Rev* 1980; 32(4):315-335.
6. Fernstrom JD. Dietary precursors and brain neurotransmitter function. *Annu Rev Med* 1981; 32:413-425.
7. Strain GW. Nutrition, brain function and behavior. *Psychiatr Clin N Am* 1981; 4(2):253-268.
8. Wurtman RJ. Food consumption, neurotransmitter synthesis, and human behavior. *Experientia Suppl* 1983; 44:356-369.
9. Schauss AG. Nutrition and behavior complex interdisciplinary research. *Nutr Health* 1984; 3:9-37.
10. Zeisel SH. Dietary influences on neurotransmitters. *Adv Pediatr* 1986; 33:23-47.
11. Yehuda S. Nutrients, brain biochemistry, and behavior: a possible role for the neuronal membrane. *Int J Neurosci* 1987; 35:21-36.
12. Wurtman RJ. Effects of their nutrient precursors on the synthesis and release of serotonin, the catecholamines, and acetylcholine: implications for behavioral disorders. *Clin Neuropharmacol* 1988; 11 (Suppl 1):Sf87-S193.
13. Lieberman HR, Wurtman RJ, Teicher MH. Aging, nutrient choice, activity, and behavioral responses to nutrients. *Ann NY Acad Sci* 1989; 561:196-208.
14. Lieberman HR, Spring BJ, Garfield GS. The behavioral effects of food constituents: strategies used in studies of amino acids, protein, carbohydrates and caffeine. *Nutr Rev Suppl* 1986; 44:61-70.